MARINE
SIKA® PRE-TREATMENT CHART

FOR MARINE APPLICATIONS

VERSION NO.: 0816

BUILDING TRUST

RECOMMENDATIONS FOR THE SIKA MARINE RANGE

PRECONDITION:

Surfaces have to be dry, free of oil, fat, dust and loose particles. Soiled non-porous substrates can be cleaned with Sika Remover-208. According to the nature of soiling, water based cleaners or steam washer etc may be used. For soiled porous substrates, grind surface down to sound material. It is recommended to verify compatibility with the cleaning products.

Substrates \ Products	Sikaflex®-291i Sikaflex®-298	Sikaflex®-295 UV	Sikaflex®-292i Sikaflex®-296	Sikasil® WS-605 S Sikasil® SG-20 Sika® Firesil Marine N
Aluminium [1]	205 → SMM	AP → 205 → SMM	AP → 205 → SMM	AP → 205
Aluminium anodised [2]	SA → 205	SA → 205 → SMM	SA → 205 → SMM	205
Steel [3]	AP → 205 → SMM	AP → 205 → SMM	AP → 205 → SMM	AP → 205
Stainless steel	AP → 205	AP → 205 → SMM	AP → 205 → SMM	AP → 205
Brass	205 → SMM	③	③	205
Metal with shop primer [9]	SA	AP → SA → SMM	AP → SA → SMM	205
Metal with 2C Ac/PU-paint [5] [8]	SA	SA	SA	205
FRP (UP,EP,PU) lay up side [5] [8]	GR-V → SMM	GR-V → 205 → SMM	GR-V → 205 → SMM	205
FRP (UP,EP,PU) gel coat side [6]	205	AP → 205 → SMM	AP → 205 → SMM	205 → SMM
PVC hard, opaque [6]	205 → SMM		205 → SMM	205
ABS [7] [8]	SMM	SMM	SMM	205
PMMA / PC	④	AP-V → 209D		AP → 205
SikaTransfloor®-352	GR-V			
Antislip deck covering	SA			
Teak	SMM	SMM		
Wood and wood derivates [10]	⑤ → SMM	SMM	⑤ → SMM	⑤ → SMM
Phenolic Plywood	GR-V → SMM		GR-V → SMM	GR-V → SMM
Ceramic screen print [8]			SA ⑥ → 206GP	205
Glass			SA	205

Substrates \ Products	Sikaflex®-290 DC	SikaTransfloor®-352
Aluminium [1]		GR-V ① → 205 → ZP
Steel [3]		GR-V ② → 205 → ZP
Metal with shop primer		GR-V → 205 → ZP
SikaTransfloor®-352		GR-V
Teak	SMM	
Wood and wood derivates	SMM	

[1] to [10] see last page „Explanatory Notes on Substrate Preparation"

1st Process = Recommendation
2nd Process = Alternative

① Alternative: Grit-blasting with aluminium oxide
② Alternative: Sandbalsting
③ If shop primer is detoriated it has to be grinded instead of scuffed (AP)
④ Do not clean with solvents
⑤ Grind off phenolic layer to bare wood where adhesive or sealant have to be applied
⑥ Only Sikaflex®-296 to be used (ensure proper UV protection)

Abbreviation	Product/Explanation
	Not applicable
GR-V	Grinding (60 -80 grit) and vacuum cleaning
AP	Abrasive Pad very fine
AP-V	Abrasive Pad very fine and vacuum cleaning
205	Sika® Aktivator-205 *
SA	Sika® Aktivator
SMM	Sika® MultiPrimer Marine
206 GP	Sika® Primer-206 G+P
209 D	Sika® Primer-209 D
ZP	Sika® Cor ZP-Primer

* Note: Product name was changed from Sika® Cleaner-205 to Sika® Aktivator-205

Note: Please also consult additional information, such as General Guidelines „Bonding and Sealing with Sikaflex®", actual Product Data Sheets, etc.
Adhesion test are based on DIN 54457 and Internal Standard CQP 033-1.

UTILISATION OF SIKA PRE-TREATMENT CHART

Information about the pre-treatment of surfaces in this document serves as a guideline only and must be verified by tests on original substrates. Project specific pre-treatment recommendations, based on laboratory tests, are available from Sika on request. The test method of adhesion test is described below.

	Sika Aktivator-205*	Sika Aktivator
Colour	Colourless, clear	Colourless to slight yellow
Type of product	Adhesion promoter	
Application temperature	General range is 10 - 35°C. *For specific values consult the corresponding Product Data Sheet*	
Application	Paper towel	
Consumption	Approx. 40 ml/m²	
Flash-off time (23°C / 50% r.h.)	The range varies from 10 minutes to max. 2 hours, depending on product and climatic conditions. Please refere to the actual Product Data Sheet for specific values.	
Colour of container cap	Yellow	Orange

* Note: Product name has changed from Sika Cleaner-205 to Sika Aktivator-205

	Sika Primer-206 G+P	Sika Primer-209 D	Sika MultiPrimer Marine
Colour	Black	Black	Transparent, yellow
Type of product	Primer		
Application temperature	General range is 10 - 35°C. *For specific values consult the corresponding Product Data Sheet*		
Prearrangement	Shake can very thoroughly until mixing ball rattles freely. Continue shaking for another minute.		n. a.
Application	Brush / felt / foam applicator	Brush / felt	Brush / felt / foam applicator
Consumption	approx. 150 ml/m²	approx. 150 ml/m²	approx. 100 ml/m²
Flash-off time (23 °C / 50% r.h.)	10 min. at > 15 °C 30 min. at < 15 °C up to max. 24 hrs.	10 min. at > 15 °C 30 min. at < 15 °C up to max. 24 hrs.	30 min. to max. 24 hrs.
Colour of container cap	Black	Green	Grey

Note: Sika® Aktivators and Primers are moisture reactive systems. In order to maintain product quality it is important to reseal the container immediately after use. With frequent use i.e. opening and closing several times, we recommend to dispose of the product one month after opening. With infrequent use, we recommend to dispose of the product 2 months after opening. For further information please refer to our „General Guidelines for Bonding and Sealing with Sikaflex®". When selecting a foam applicator, the solvent resistance has to be taken into account, e.g. melamine foam Basotect from BASF is suitable.

ADHESION TEST FOR ELASTIC ADHESIVES OR SEALANTS

Apply a bead of about 1 cm diameter on an original substrate which has been prepared in accordance with the recommendation (see pic. 1). Allow the bead to cure for 4 days at room temperature and 3 days in tap water.

Test: Separate the first 3 cm of the bead near the substrate using a sharp Stanley knife. Grip the separated portion of the bead with a pair of needle nose pliers and slowly turn the bead (applying peel stress) attempting to separate it from the substrate. Keep peeling and cut down to the substrate several times as shown in picture 2.

Result: There are three distinct types of results:

- Cohesive failure is when the failure is within the bondline (cohesive failure/ best result) (see pic. 3)
- Separation in the substrate (normally acceptable result) (see pic. 4)
- The adhesive pulls totally off the substrate (adhesion failure/ bad result) (see pic. 5)

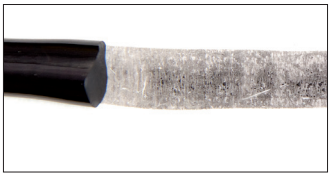
Combinations of failure modes are also possible. 95% or greater cohesive failure is considered excellent adhesion (see pic. 4 middle). More than 75% cohesive failure is considered acceptable in cases of low strain on the bond line.

Pic 1: Apply bead on original substrate

Pic 2: Peel of the aged bead using a plier

Pic 3: Sample with an excellent adhesion

Pic 4: Good adhesion with some cohesive failures in the substrate



Pic 5: Bad adhesion. Nothing or a thin film remaining on the substrate

EXPLANATORY NOTES ON SUBSTRATE PREPARATION AND TREATMENT

1. Aluminum
Aluminum and aluminum alloys are supplied in the form of profiles, sections, sheets, plates and castings. The information given here on surface preparation and priming relates to this group of products. Alloys containing magnesium may have water-soluble magnesium oxide on the surface. This oxide layer has to be removed with very fine abrasive pads. In the case of aluminum that has been surface treated (chromated, anodized or coated), a simple pre-treatment is usually sufficient.

2. Anodized aluminum
Aluminum is a reactive material which oxidizes on exposure to air. Anodization is an electrochemical or chemical process to protect aluminum from corrosion by forming a tough surface layer. Due to the wide variety of treatments such as coloring, sealing as well as the application of translucent lacquers of varying chemical composition, it is required to run preliminary tests to check for satisfactory adhesion.

3. Steel
Depending on the exposure conditions, steel is subject to corrosion. Sika primers, which are applied to the surface in a very thin layer, do not provide corrosion protection as such.

4. Stainless steel
The terms "stainless steel" and "special steel" embrace a whole group of products of varying chemical composition with varying surface finishes. These have an important influence on the adhesion behavior. The surface may contain single type chromium oxide. By removing it with a very fine abrasive pad the adhesion can be improved.

5. Hot dipped, galvanized steel
The principal techniques for applying zinc coatings to steel are a) the Sendzimir process, b) electrogalvanizing, c) hot dip or continuous strip galvanizing. In the case of a) and b) the substrate is prepared to a controlled specification and the composition of the surface layer is more or less uniform throughout. The surface composition of hot dipped components is not uniform. It is therefore necessary to carry out periodic adhesion checks. Oiled zinc coated steel has to be degreased prior to use. Do not use abrasives in case of electrogalvanized steel.

6. Non ferrous metals
Metals like brass, copper and bronze are prone to interact with the sealant or adhesive. Therefore it is recommended to contact Sika for advice prior to the use.

7. FRP (fibre reinforced plastic)
These materials consist for the most part of thermosetting plastics derived from unsaturated polyesters, less commonly from epoxy resins or polyurethanes. Newly manufactured components based on unsaturated polyesters contain quantities of styrene in monomeric form, recognized by its distinctive odor. These components have not yet attained full cure, and as such are subject to further shrinkage following their removal from the mould. For this reason only aged or tempered FRP mouldings should be selected for adhesive bonding. The smooth side (gel coat side) may be contaminated with mould release agent, which will adversely affect adhesion. The rough reverse side, which is exposed to the air during manufacture, usually contains paraffin, added to assist air drying. Here it is necessary to abrade the surface thoroughly prior to additional surface preparation. Thin section FRP mouldings made from transparent or pale colored material are translucent. In such cases a suitable UV barrier must be incorporated (see also point 9. Transparent or translucent substrates). Preliminary tests must be carried out to determine the most appropriate method of surface preparation.

8. Plastics
Some plastics require special physico-chemical treatment before they can be successfully bonded (flame treatment or plasma etching in combination with chemical pre-treatment). Polypropylene and polyethylene are two examples. With many plastic blends (e.g. engineering plastic) it is impossible to give specific guidance due to the potential variety of components and internal/external release agents they contain. Thermoplastics are subject to a risk of stress cracking. Thermally formed components must be destressed prior to adhesive bonding process. For transparent or translucent plastics see point 9.

9. Transparent or translucent substrates
In the case of transparent or translucent substrates where the bond face is exposed to direct sunlight through the transparent or translucent layer, some form of UV barrier must be incorporated to shield the adhesive bond. This may consist of an opaque cover strip, an optically dense screen printed border or a black primer for semi transparent substrates such as translucent FRP or screen prints. Due to the high UV exposure on external application a black primer as a sole UV protection is not suitable. For inhouse applications and where the bondline is occasionally exposed to UV, a sole black primer for UV protection might be suitable.

10. Surface coatings, paint finishes
Preliminary trials are necessary before attempting to bond substrates with an applied surface coating. As a general rule, reactive systems that cure thermally (cataphoretic immersion coatings, powder coatings) or by addition of polymerisation (epoxy or polyurethane paints) can usually be successfully bonded with Sikaflex and SikaTack products. Alkyd resin paints that dry by oxidation are not suitable for bonding. Paint systems that rely on a physical cure mechanism – typically coatings based on polyvinyl butyral or epoxy resin esters – are generally compatible with sealants only, i.e. not with adhesives. Caution: The presence of paint additives designed to modify film formation, such as conditioners, silicones, matting agents, etc., may adversely affect adhesion to the paint surface. Consider that certain coatings can be negatively influenced by wheatering, for example if exposed during transport prior the bonding and sealing process. Surface coatings must be monitored for consistency of quality and uniformity of composition through a quality assurance system.

11. Phenolic film faced plywood
These are waterproof plywood panels with a yellow or brown film facing. The surface preparation is the same as for paints and coatings. Due to the variety of coatings the required adhesion may not always be achieved. In such case grind the surface down to the wood and pre-treat it as such.

Overpaintablility
Sikaflex-500 Series products can be over painted with a variety of paint systems (including water based). Alkyd-based and acid-curing paints are not suitable. Over painting can be done wet-on-wet and up to 2 - 3 hours after application. Adhesion on fully cured Sikaflex-500 Series products can be improved by treating the product with Sika Activator-205 prior to painting.
Paints must be tested for compatibility by carrying out preliminary trials under manufacturing conditions. Note that non-flexible paint systems will impede joint movement, which in extreme cases can lead to cracking of the paint.

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